

tions but it seems to me that for economic reasons it would be better for the state to furnish one or two of these institutions, or, possibly combine two in one. Until these units are a reality patients in the present city institutions will continue to run around the circle: In the hospital until their improvement warrants their discharge to make room for more advanced cases, then after working a while at improper work to the clinic in a worse condition, then back to the hospital as bed patients. Too often have we who are doing dispensary work seen the operation of this circle. It makes no difference whether the patient returns again to the San Francisco Hospital or decides to go to the Los Angeles Hospital, the circle is there just the same and the prognosis in this great majority will continue to be bad.

Lastly, the opportunity for proper treatment and care. A majority of the tuberculous in every day life are not able to get this care and are obliged to work to support themselves and those dependent upon them at vocations not suited to their condition until the disease has progressed to such a stage that hope for cure or the arresting of the disease is out of the question. And this opportunity for proper treatment and care is by far the greatest factor in determining our prognosis, for without it hope is practically gone and in proportion to the degree of care and attention the patient is able to receive in that same proportion does the outlook for future improvement brighten.

THE TREATMENT OF PULMONARY HEMORRHAGE.*

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My excuse for presenting a paper to this society upon this subject is the great variation and lack of logic of the medicinal treatment as given by the various authors.

In considering the treatment of a hemorrhage there are three essential things from the conditions of which must evolve the theories regarding the treatment. The first is the condition of the ruptured vessel; the second, the condition of the elements of the blood which make up the clot, and the third is the pressure under which the blood is flowing in the vessel.

In pulmonary hemorrhage there are two sets of vessels to consider, the bronchial and the pulmonary. Of these two sets there are three portions, any one of which may be ruptured, viz.: artery, vein or capillary.

Rasmussen,¹ in 1868, studied pathological specimens of the lungs in pulmonary hemorrhage, and came to the conclusion that hemorrhage nearly always took place from the pulmonary arteries. Preceding the hemorrhage small aneurisms were formed, which caused a thinning of the vessel wall. Probably the cases in which the sputum is only slightly streaked come from ruptured capillaries.

In considering the ability of the blood to form

a firm clot, the question immediately arises whether in tuberculosis, complicated by pulmonary hemorrhage, there is any change in the elements of the blood which produce the clot. While we have not tested the blood of tuberculous patients for thrombokinase, antithrombin, prothrombin, etc., yet we believe that for all practical purposes, if the clotting period is not increased, if the bleeding time is not lengthened, and if the blood platelets are not diminished, we may conclude that the blood condition is no causative factor in producing or prolonging the hemorrhage.

In our endeavor to ascertain the state of the blood we studied the blood platelets, clotting period and bleeding time upon fourteen cases of pulmonary tuberculosis, nine of which were studied during an attack of hemoptysis.

The platelets were counted after the technic of Wright and Kinnicutt² with the brilliant-cresyl blue and potassium cyanide stain. The clotting period was done with Duke's³ modification of Milian's method, in which a drop of blood 5 mm. in diameter was observed at 40° centigrade until firmly clotted, and the bleeding time was done with Duke's method. A stab wound sufficient to cause free bleeding was made in the ear and in one-half minute a piece of filter paper was applied, taking up all the blood. This was repeated every half minute until no blood appeared. The following table gives the results in the fourteen patients:

Hemorrhage Patients.

Blood Platelets,	Highest	Lowest	Average
9 cases.	1,194,000	344,000	548,000
Clotting Time,	Longest	Shortest	Aver.
8 cases.	Time	Time	Time
8 cases.	6 min. 30 sec.	4 min.	5 min. 12 sec.
Bleeding Time,	Longest	Shortest	Aver.
6 cases.	Time	Time	Time
6 cases.	3 min. 30 sec.	1 min.	2 min. 10 sec.

Patients Having Had No Hemorrhages.

Blood Platelets,	Highest	Lowest	Average
5 cases.	602,000	271,000	448,400
Clotting Time,	Longest	Shortest	Aver.
4 cases.	Time	Time	Time
4 cases.	8 min.	6 min.	6 min. 45 sec.
Bleeding Time,	Longest	Shortest	Aver.
3 cases.	Time	Time	Time
3 cases.	4 min.	2 min. 30 sec.	3 min. 10 sec.

From the foregoing it is noted that, taking 250,000 to 350,000 platelets as the normal, according to Wright's and Kinnicutt's investigation, the average number of platelets was increased in tuberculosis, a greater number being present in hemorrhage cases than in non-hemorrhage cases, the average being 548,000 and 448,400 respectively.

Considering the normal clotting time as being five to eight minutes, my cases all come well within this limit, the average in hemorrhage cases being 5 mins. 12 secs., as against 6 mins. 45 secs. in the non-hemorrhage cases.

Duke found the normal bleeding time with the method used to be one to three minutes. It will be seen that my cases all came practically within these limits, the average in the hemorrhage patients being 2 mins. 10 secs. and in the non-hemorrhage 3 mins. 10 secs.

We would conclude, then, from the few cases observed, that in none of them was the blood con-

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dition, so far as forming a thrombus in the ruptured vessel is concerned, a factor in causing or prolonging the hemorrhage.

Treatment. In considering the treatment we will take it up under three phases, viz.: forming the clot, constricting the end of the broken vessel, and lowering the blood pressure.

Forming the Blood Clot. Wright⁴ showed from his experiments in quite a long series of cases that in normal individuals he could decrease the clotting period of the blood from one-half to one-quarter the normal time by the exhibition of calcium. He also found that a single dose of 60 grs. of either the lactate or the chloride would take effect in 20 minutes, showing its maximum effect in 45 minutes and lasting from four to seventeen days. Hence it would seem that 60 grs. of calcium lactate or chloride, given immediately upon the onset of hemorrhage, would, by increasing the rapidity with which the clot was formed, assist in plugging up the ruptured vessels. This should be repeated in at least four days. Because of the increasing frequency with which horse serum is used in the treatment of diseases, and the lack of sufficient proof that it shortens clotting or bleeding time of the normal blood, we would suggest that it be discontinued in pulmonary hemorrhage unless there is a definite pathological change in the blood.

Ruptured Vessel End. Owing to the diseased condition of the broken vessel as mentioned above, it is probable that it does not respond to the vasoconstrictor drugs as adrenalin and nitroglycerin, but that on the contrary an injury is done by causing a constriction of the pulmonary arterial system, thus raising the pulmonary blood pressure, which is just the thing that should be avoided. Possibly the ice bag causes a constriction of the vessels immediately surrounding the area of hemorrhage, thus lessening the amount of blood coming to that area, and in this way is beneficial. The application should not continue over one hour at a time, or the cutaneous area will become so numb that the effect is lost.

Lowering Blood Pressure. This is probably the most important thing to be accomplished, and it appears that most of the routine treatment which produces any benefit causes it in this manner. Wiggers⁵ states that "the object of paramount importance is to promptly reduce the bleeding by such drugs as lower the pressure in the pulmonary circuit."

Rest in bed, without a pillow, and without even raising the hand, is beneficial only as it lowers the blood pressure and lessens pulmonary movement. The blood should be expectorated into a basin or gauze without raising the head.

If the hemorrhage is rather severe, nourishment and liquids should be limited to chips of ice to quench the thirst for the first twenty-four hours, and to about one quart of cold milk during the second twenty-four. In addition to this a sufficient amount of a non-effervescent saline should be administered to produce two soft stools per day, as emphasized by Burns.⁶ This should be administered in a rather concentrated form, in order

to remove as much liquid from the blood as possible, thus perhaps lowering pressure and hastening clotting. The saline also assists in eliminating any of the pressor poisons, if there be such, which otherwise might be absorbed from the intestines.

In order to allay the excessive coughing, an opiate is advisable. Codeine or heroin, administered hypodermically or by mouth, are preferable, as they are less constipating than morphine.

A good rule is to give one-half grain of codeine every hour until the coughing is relieved.

The other drugs used aim directly at lowering of pressure, the principal ones of which have been carefully studied by Wiggers⁷ in his splendid work reported in 1911. In this work digitalis, strophanthin, ergotoxin, pituitary extract, nitroglycerin and chloroform were experimented with.

Wiggers found that digitalis produced an increase of both systemic and pulmonary pressure in dogs, both with and without pulmonary hemorrhage.

The action of strophanthin and ergotoxin was the same as digitalis, with the exception that there was no change in either systemic or pulmonary pressures during hemorrhage; hence, both should be discarded, except in capillary hemorrhage.

Chloroform was found to decrease both systemic and pulmonary pressures, as well as to slow respiration. This corresponds to the observations of Fish⁸ in hemoptysis, and hence would appear to be a beneficial measure. Fish recommends three to four cc. applied to gauze, or a mask, to be inhaled at the beginning of the hemorrhage, and followed by fifteen to twenty drops, every hour, for from two to three days.

The effect of the nitrites was rather peculiar. Wiggers found that they lowered systemic pressure in both normal and bleeding dogs, but that they increased pulmonary pressure except late in hemorrhages. The explanation of this is found in the recent work of Macht,⁹ who showed that strips of pulmonary arteries contracted upon the application of a solution of the nitrites. Macht reasoning from this suggests that they would be beneficial in hemoptysis. His reasoning, however, is faulty in that he evidently did not consider that the broken vessel was diseased, and hence would not respond to a stimulus as would a normal one. On the other hand, because of the effect of the nitrites upon the normal vessels, the pulmonary pressure would be increased, which is the opposite condition to be desired. This would lead one to believe that the wide clinical observation, leading to a belief in the efficacy of the nitrites in pulmonary hemorrhage, is at fault, and that their results are probably injurious instead of beneficial.

Pituitary extract was found to raise systemic pressure and to lower pulmonary pressure, both in the normal and bleeding animals, and hence would seem an ideal drug in this condition. Hypodermic injections of one-half to one cc. ampoules, given twice daily, seems to have borne this theory out in practice.

Atropin has been suggested because of its depressing effect upon the vaso-motor system and the relief it gives to the coughing.

Adrenalin would appear to be injurious, as its constrictive action upon the blood vessels would cause an increase of blood pressure.

Because of its depressing effect upon the heart and blood vessels, aconite has been used in hemoptysis. Three to five drops of the tincture given every three hours would undoubtedly lower pulmonary pressure. The liability of a hemorrhage patient to pneumonia and the frequency of some cardiac disease would certainly limit its usefulness.

I have purposely refrained from discussing artificial pneumothorax in pulmonary hemorrhage, because of the volume of recent literature which so thoroughly and completely treats all phases of this procedure.

From the few foregoing observations we would conclude the following:

(1) Because of the disease of the broken vessel, little good can be expected from the use of vasoconstrictor drugs, but injury may result from their action upon the portion of the vessel which is healthy, by raising the blood pressure throughout.

(2) Calcium, in dram doses, should be administered at once when hemorrhage from the lungs occurs.

(3) Neither digitalis nor strophanthin are indicated, except in capillary hemorrhage.

(4) Theoretically, nitrites, instead of being beneficial in pulmonary hemorrhage, are injurious, unless administered after the loss of a goodly quantity of blood.

(5) Absolute rest, little food or liquids, with thorough evacuation of the bowels by means of saline laxatives, are among the most important features of the treatment.

(6) Pituitary extract comes the nearest, theoretically, to being the ideal drug for this condition.

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THE BUREAU OF TUBERCULOSIS, ITS WORK AND PLANS.*

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The object of the Bureau of Tuberculosis as planned by the Tuberculosis Commission of 1911 is familiar to most of you. It was the intention of the commission that this bureau should super-

wise all work within the state bearing upon the preventive, curative and other aspects of the tuberculosis problem. That it should advise or direct all local bodies in making provision for the treatment of tuberculosis in sanatoria, hospitals, dispensaries, farm colonies and other institutions, both public and private; that it should advise with the officers of penal and charitable institutions regarding the care of tuberculous inmates and should make all necessary rules and regulations for the effective carrying out of the work of the bureau.

The law which was passed by the last legislature, as the result of the recommendations of this commission did not assign any such general duties as planned by the Tuberculosis Commission, but specified three groups of duties, 1. "The complete and proper registration of all tuberculous persons within the state." 2. The inspection of institutions treating tuberculosis, both public and private; and 3. Those assigned by the Board of Health, (including the duties of assistant secretary). The latter group was apparently intended to provide for the more aggressive and constructive work outlined by the commission.

For the work of inspection and registration and all other non-specified duties there was an appropriation aside from the salary of the director of \$750 a year. It is evident that this sum, after meeting the expenses of traveling, stenography, printing and postage, leaves little margin for carrying out the details of any elaborate system of tuberculosis registration, or method of discovering unreported cases.

The other recommendations of the Tuberculosis Commission which cannot become effective without large appropriations are, briefly, 1, The establishment of a system of tuberculosis dispensaries available for both the city and rural populations of the state. 2, Provision for advanced cases in special hospitals provided by the counties with state aid, either singly or by districts consisting of two or more contiguous counties; and by agreements between counties and private tuberculosis institutions. The commission also recommended 3, state sanatoria for early cases, and 4, farm colonies for incipient and convalescent cases.

Registration.—It is not necessary to point out at this time the importance of registration of tuberculosis, it is universally admitted among those who have made a study of the question, that no general campaign for the control or the eradication of tuberculosis can be properly planned or conducted without first ascertaining the extent and distribution of the disease. This bureau has made an effort to obtain the registration of tuberculosis, first by bringing the law which requires registration of tuberculosis to the attention of physicians. The first step taken in this line was the sending to 284 health officials a signed letter calling attention to the law. Later a letter was written to the secretary of each of the county societies requesting that the subject of registration of tuberculosis be given special attention in the local society and that the letter be read to each society. This letter was also published in

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